FPM-3220

Industrial Control Panel
with 12.1" LCD and
Data-Function Keypad

Users Manual

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警告使用者

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

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FCC Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy. If not installed and used in accordance with this user's manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Packing List

Before you set up the FPM-3220, make sure that the following items have been included in your package, and that this manual is in good condition. If anything is missing or damaged, contact your dealer immediately:

- FPM-3220 control panel
- Accessory pack, including:
  - FPM-3220 User's Manual
  - A HMI Products, Drivers, Utilities CD
  - An AC/DC power adapter
  - A power adapter mounting bracket
  - A power connector fix bracket
  - A 1.8 m Power chord
  - A 1.8 m VGA cable
  - A PS/2 keyboard/mouse Y-cable
  - A 1.5 m PS/2 cable
  - A wall/desktop mounting bracket
  - A locking bracket
  - Four panel mounting brackets
  - A screw bag
  - A 1.8 m RS-232 cable (FPM-3220T-T only)
  - A TSCB-9516 drivers installation guide (FPM-3220T-T only)

If any of these items is missing or damaged, contact your distributor or sales representative immediately.

Additional Information and Assistance

1. Visit the Advantech web site at **www.advantech.com** where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:

- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version, application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User's Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped and damaged.
    f. The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Wichtige Sicherheishinweise

1. Bitte lesen sie Sich diese Hinweise sorgfältig durch.
2. Heben Sie diese Anleitung für den späteren Gebrauch auf.
3. Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Verwenden Sie Keine Flüssig-oder Aerosolreiniger. Am besten dient ein angefeuchtetes Tuch zur Reinigung.
4. Die NetzanschluBsteckdose soll nahe dem Gerät angebracht und leicht zugänglich sein.
5. Das Gerät ist vor Feuchtigkeit zu schützen.
6. Bei der Aufstellung des Gerätes ist auf sicheren Stand zu achten. Ein Kippen oder Fallen könnte Verletzungen hervorrufen.
7. Die Belüftungsöffnungen dienen zur Luftzirkulation die das Gerät vor überhitzung schützt. Sorgen Sie dafür, daB diese Öffnungen nicht abgedeckt werden.
8. Beachten Sie beim. AnschluB an das Stromnetz die AnschluBwerte.
9. Verlegen Sie die NetzanschluBleitung so, daB niemand darüber fallen kann. Es sollte auch nichts auf der Leitung abgestellt werden.
10. Alle Hinweise und Warnungen die sich am Geräten befinden sind zu beachten.
11. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.
12. Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. elektrischen Schlag auslösen.
13. Öffnen Sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von authorisiertem Servicepersonal geöffnet werden.
14. Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einer qualifizierten Servicestelle zu überprüfen:
    a - Netzkabel oder Netzstecker sind beschädigt.
    b - Flüssigkeit ist in das Gerät eingedrungen.
    c - Das Gerät war Feuchtigkeit ausgesetzt.
    d - Wenn das Gerät nicht der Bedienungsanleitung entsprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.
    e - Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.
    f - Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.

Der arbeitsplatzbezogene Schalldruckpegel nach DIN 45 635 Teil 1000 beträgt 70dB(A) oder weiger.

DISCLAIMER: This set of instructions is given according to IEC704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

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CHAPTER 1

Introduction

- Introduction
- Specifications
- Complete Functionality
- Dimensions

Chapter 1 Introduction

1.1 Introduction

The FPM-3220 control panel series are the new Advantech LCD control panel with 64 data-entry keys, 10 function keys, 10 unique programmable macro keys and 12 SVGA 800x600 TFT LCD. The strong membrane key function lets FPM-3220 a powerful panel programming benefit like standard workstation, but none of deep space problem. Equipped with direct VGA interface, FPM-3220 can connect to any PC Box in long distance range without wiring and cabling limit faced by tradition bulky workstation. Optional front FDD access design gives users to retreat and install data easily. The FPM-3220 is a perfect and cost effective control panel selection with PCs for machine builders like packaging, cutting, CNC, and production line control.

1.2 Specifications

General

- **Display type:** 12.1" color TFT LCD
- **Display resolution:** SVGA (800 x 600)
- **Display control:** Front accessible display on/off switch and OSD (On screen display) key on back cover
- **Display interface:** standard analog RGB (VGA) 15 pin connector
- **Membrane keypads:** One with 60 data-entry keys, one with 10 function keys and 10 programmable macro function keys
- **Keyboard/mouse connector:** Two 6-pin PS/2 keyboard/mouse connectors available, one on front panel and the other on back chassis
- **Front panel:** Aluminum, NEMA4/IP65 compliant
- **Mounting:** Rack, Panel, Wallmount, VESA arm or desktop mounting
- **Power:** External 48 W power adapter, with AC 100 V ~ 240 V 50/60Hz input and DC +12 V@ 4 A output, CUL/CSA/CE/TUV/CB certified
- **Disk drive housing kit (optional):** Supports one slim 3.5" FDD and one slim CD-ROM

- **Operating temperature:** 0° ~ 50° C (32° ~ 122° F)
- **Relative humidity:** 5 ~ 85% @ 40° C, non-condensing
- **Storage temperature:** -20° ~ 60° C
- **Storage humidity:** 5 ~ 95% non-condensing
- **Dimensions (W x H x D):** 482 x 266 x 63 mm (19.0" x 10.5" x 2.5")
- **Gross Weight:** 5 kg (11 lbs)
- CE, FCC, BSMI compliant

LCD Display

- **Display type:** SVGA TFT LCD
- **Display size:** 12.1"
- **Max colors:** 262K
- **Max resolution:** 800 x 600
- **Viewing Angle:** 90°(H), 40°(V)
- **Luminance:** 200 cd/m^2
- **Storage Temperature:** -20° ~ 60° C
- **Storage Temperature:** 0° ~ 50° C
- **Backlight lifetime:** 20,000 hrs
- **Contrast Ratio:** 150:1 (typ)

Touchscreen (Optional)

- **Type:** 8 wire, analog resistive
- **Resolution:** continuous
- **Light transmission:** 75%
- **Operating Pressure:** 30 ~ 45 grams for stylus pen, contact bounce < 10 ms
- **Controller:** RS-232 interface
- **Power Consumption:** +5 V @ 200 mA
- **OS support:** MS-DOS, Windows 3.1/95/98/NT/2000
- **Life span:** 100 million touches

1.3 Complete Functionality

FPM-3220 features rich and complete functions especially designed for industrial control applications

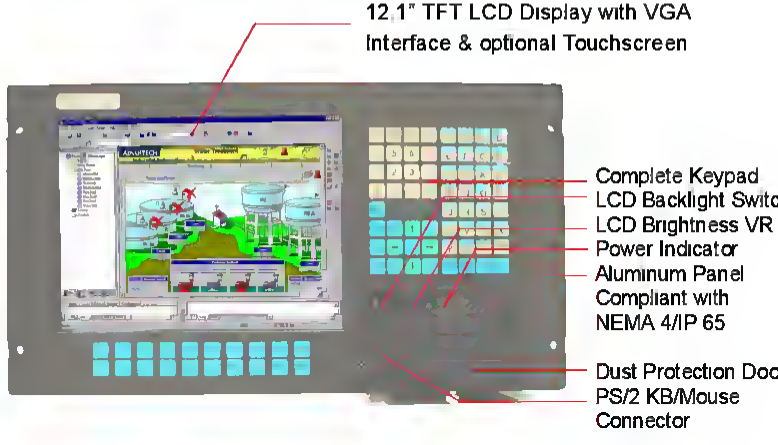
12.1" TFT LCD Display with VGA Interface & optional Touchscreen
Complete Keypad
LCD Backlight Switch
LCD Brightness VR
Power Indicator
Aluminum Panel Compliant with NEMA 4/IP 65
Dust Protection Door
PS/2 KB/Mouse Connector

Figure 1.1: Front panel layout

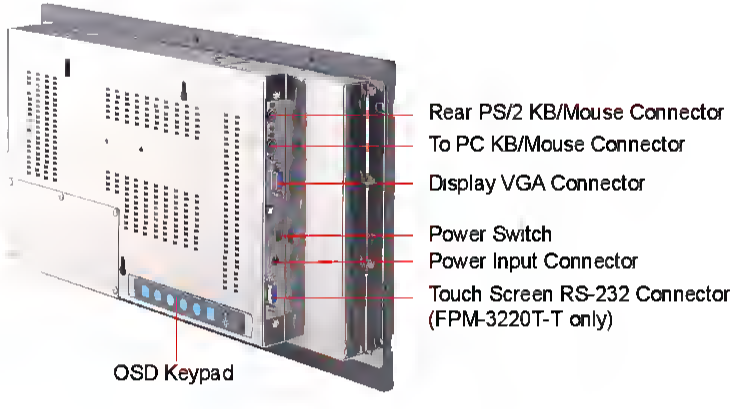

Figure 1.2: Rear chassis layout

1.4 Dimensions

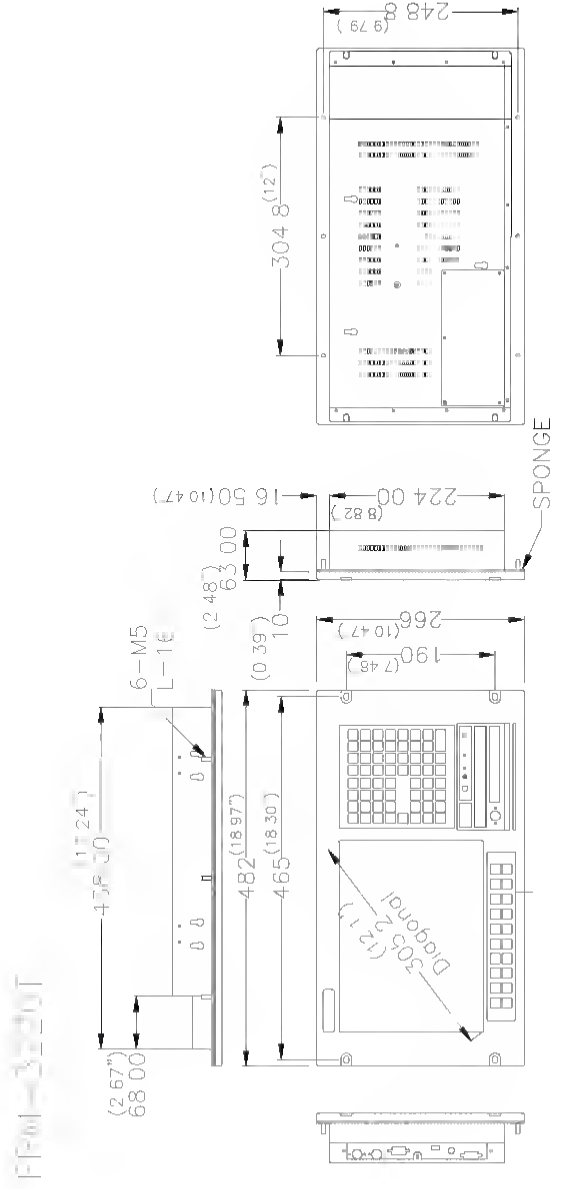

Figure 1.3: FPM-3220 Dimensions

CHAPTER 2

System Setup

- Connecting to Controller
- Install the Power Adapter
- Connecting External Keyboard and Mouse
- Panel Mounting
- Rack Mounting
- Wall Mounting
- Desktop Stand
- Swing Arm Mounting

Chapter 2 System Setup

2.1 Connecting the Controller

The FPM-3220 is designed to be the operation panel for your system. It's equipped with PC standard interfaces that are easily found on PC-based controller.

There are three connections between the FPM-3220 and the controller: VGA, Keyboard, and optional RS-232 of touch screen.

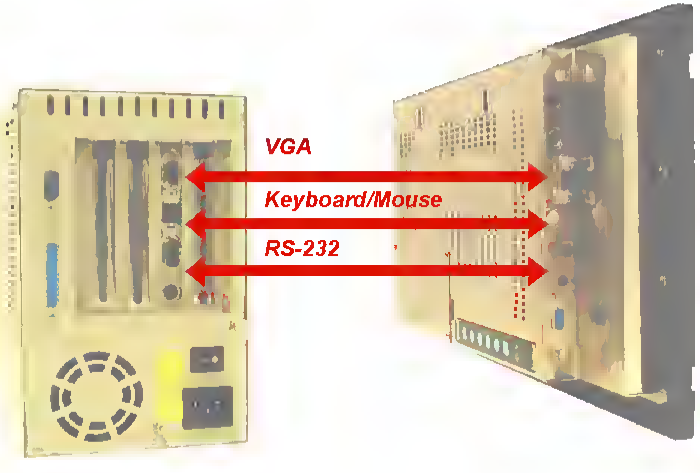

Figure 2.1: Connecting the Controller

2.2 Install the Power Adaptor

The power adapter could be mounted on the back cover with a power adapter-mounting bracket in the accessory box as following figure shown. In order to secure the power connector, there is a connector fixing plate in the accessory box also, and it could be installed as shown in the following figure.

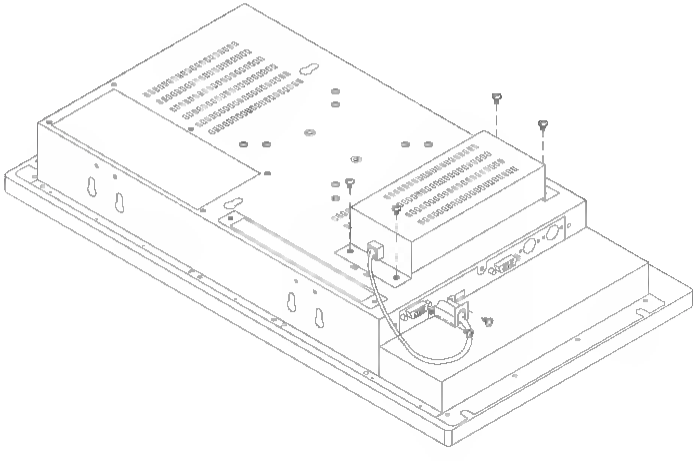

Figure 2.2: Mounting the Power Adaptor

2.3 Connecting External Keyboard and Mouse

You can connect an external keyboard and mouse to FPM-3220. The first place to the connect keyboard and mouse is the PS/2 connector on the front panel, under the dust-protection door. You can connect a PS/2 keyboard to the connector if you do not need a mouse. Or use the Y-cable provided in the accessory box to connect simultaneously a keyboard and a mouse. There is another additional PS/2 keyboard/Mouse connector on the back chassis as shown in figure 2-4. You cannot connect two external keyboards or two Mouses in the same time. But you could connect a keyboard and a Mouse to the same or different front and back PS/2 connector

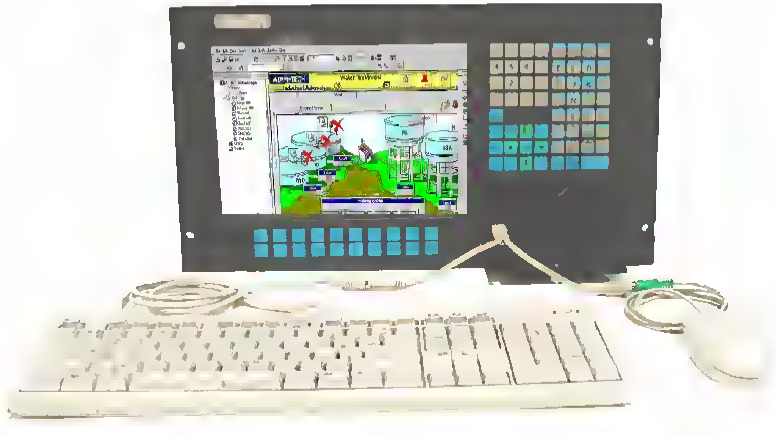

Figure 2.3: Connecting Front External Keyboard/Mouse

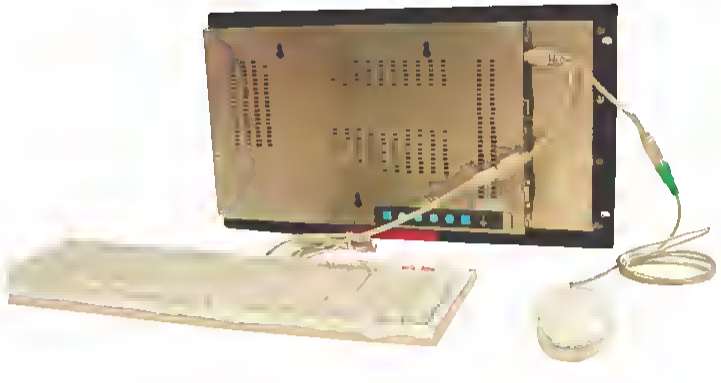

Figure 2.4: Connecting Back External Keyboard/Mouse

2.4 Panel Mounting

A cutout need be made to accommodate panel mounting. Four panel-mount brackets are included in the accessory box. Slide the unit backward into the panel opening. Attach the four mounting brackets by inserting the screws into the keyhole slots on the flat panel monitor cover. Use the screws to secure the brackets to the cover. Tighten to secure the front panel monitor against the back panel.

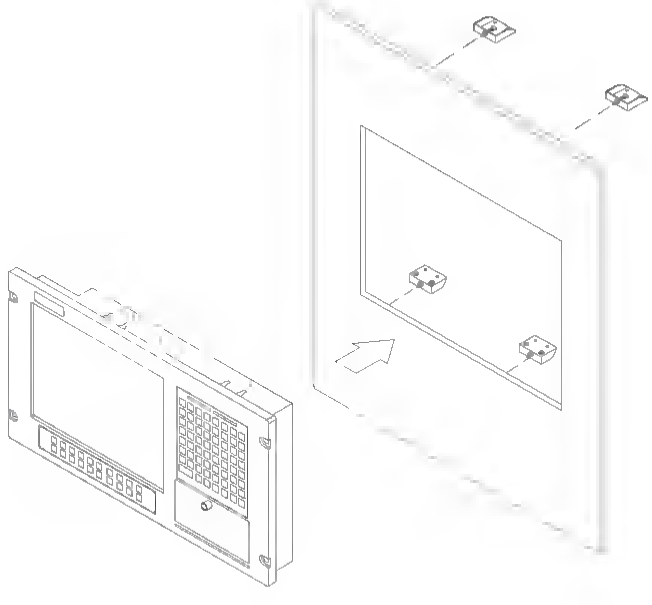

Figure 2.5: Panel Mounting

2.5 Rack Mounting

The FPM-3220 can be directly mounted in a standard 19" rack. Just mount the panel on the rack and secure with four screws.

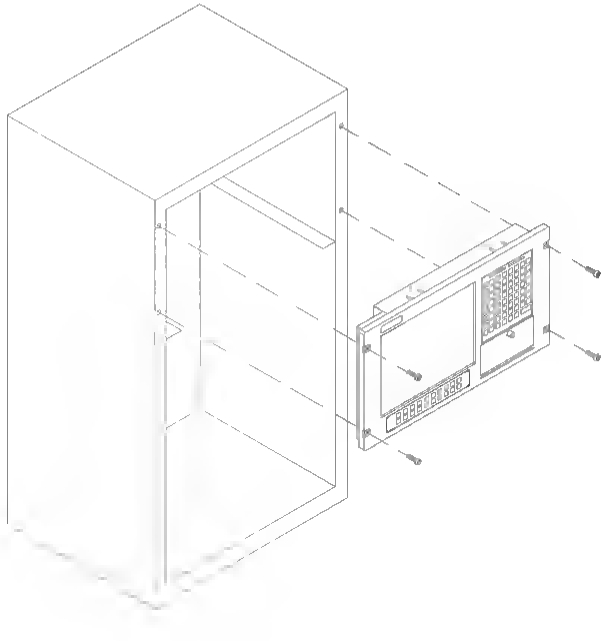

Figure 2.6: Rack Mounting

2.6 Wall Mounting

First mount the wall/desktop-mounting bracket to the wall, then mount the FPM-3220 on the bracket through the three screws, finally secure the panel to the mounting plate with the locking plate.

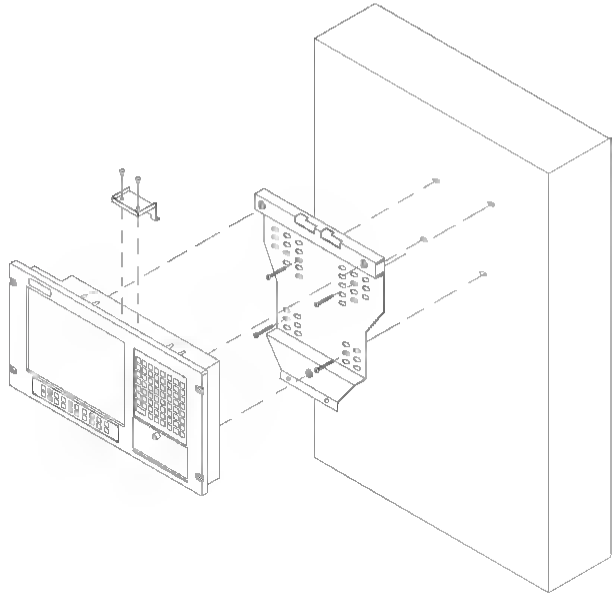

Figure 2.7: Wall Mounting

2.7 Desktop Stand

Mount the wall/desktop-mounting bracket to the back of FPM-3220 with two screws as following drawing shown

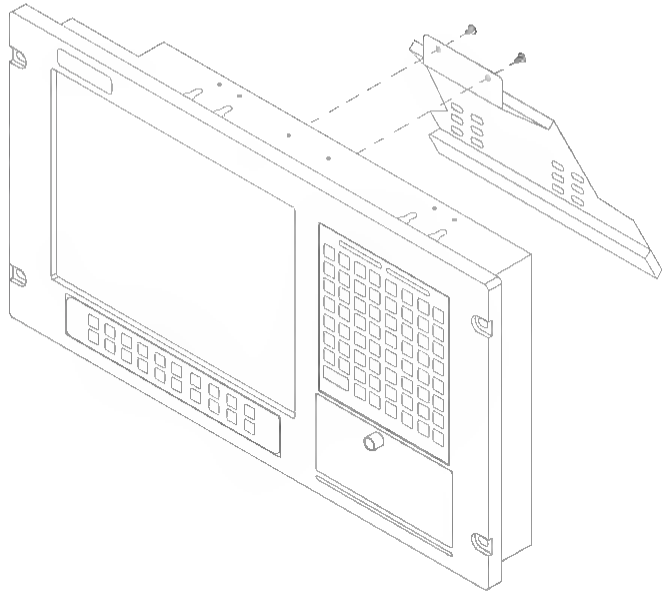

Figure 2.8: Desktop Stand

2.8 Swing Arm Mounting

There are two sets of Swing-ARM mounting holes, 75 mm and 100 mm format, on the back chassis. You could Mount FPM-3220 on the Swing-ARM through the mounting holes and secure with four screws.

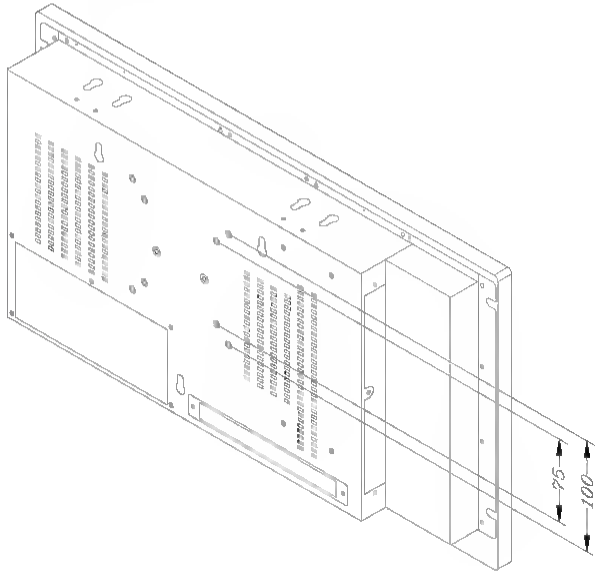

Figure 2.9: Swing Arm Mounting

CHAPTER 3

Macro Key Programming

- Introduction
- Macro key overview
- Syntax
- Using SFED3220 COM
- Examples

Chapter 3 Macro Key Programming

3.1 Introduction

Our workstations are equipped with programmable function keys (macro keys) that greatly enhance the operator interface. Macros, which are far more powerful than batch files, automate the most commonly used input sequences. They extended their functional reach to within application programs.

3.2 Macro Key Review

The complete macro function consists of the following elements:

Macro keys (SF1, SF2,... SF10)

Ten programmable macro keys that are located on the dust-proof door on the front panel of your workstation.

Macro EEPROM

Holds the key sequences that are activated when the corresponding macro key is pushed.

Macro programming utility

In the sub-directory, Drive&utility/FPM series/KBT-utility, of the HMI utility CD-ROM, you will find a program called SFED3220.COM. The SFED3220 program provides an edit function to produce an ASCII file that contains key stroke sequences for every macro key. After you have finished editing the file, the program will ask you whether you want to save the macro script and/or transmit it to the EEPROM. Macros consist of keystroke sequences to automate the most common procedures in your application. The way they function is much like batch files (.BAT) under DOS, but there are some differences. In a Macro, you have to specify the ENTER key explicitly. Also, macros give you the option of entering key sequences in an application that was executed by the macro itself.

3.3 Syntax

Macro definitions consist of ASCII characters or character codes for special characters (ALT, ENTER, SHIFT, F1, SF2, and so on). These codes are predefined, and SFED3220.COM will display them on the screen for you. They are easily recognizable,

appearing between the square brackets, "[" and "]"

For example:

ALT is represented by [26]

ENTER is represented by [33]

In your macro script, you can enter ordinary text (ASCII characters) or the code(s) of the required special character(s).

For example:

CD\TOOLKIT[33] means CD\TOOLKIT [ENTER]

For combination keystrokes (ALT/SHIFT/CTRL + another key) enter the codes of the special characters, followed by [90]

(RELEASE)

For example

ALT-F1 is represented by [26][44][90]

CRTL-C is represented by [28]C[90]

SHIFT-B is represented by [27]B[90]

ALT-X is represented by [26]X[90] or [26]x[90]

ALT-F1 is represented by [26][44][90]

SHIFT-X is represented by [27]X[90]

SHIFT-F1 is represented by [27][44][90]

CTRL-X is represented by [28]X[90]

CTRL-F is represented by [28][44][90]

CTRL-ALT-DEL is represented by [28][26][41][90] (reboot)

CTRL-ALT-A is represented by [28][26]A[90]

CTRL-SHIFT-1 is represented by [28][27]1[90]

Another useful function is the DELAY instruction. You can instruct the macro program to wait before executing the next keystroke. SFED3220.COM displays the codes that you can use for various delays.

For example

[86] - wait for 10 seconds before executing next keystroke

[88] - wait for 1 minute before executing next keystroke

[26]A[90][86][26]B[90] means ALT-A, wait 10 seconds, ALT-B

3.4 How to use SFED3220.COM

First, boot your system under pure DOS mode (not DOS shell in windows) and copy all the files to your hard disk and/or make a backup disk. Then start the macro editor. You will have to specify either an existing macro script file or a new macro script file. Here we will create a new file by typing SFED3220 NEWKEY.TXT [ENTER].

The following screen will appear:

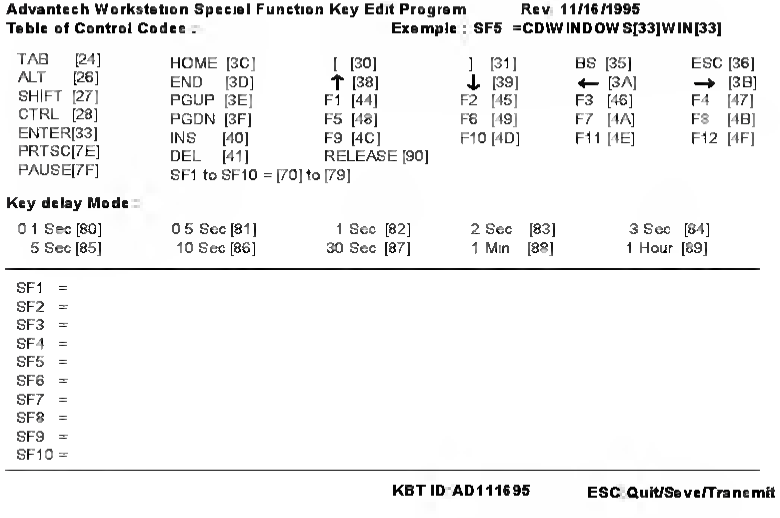
Advantech Workstation Special Function Key Edit Program Rev. 11/16/1995
Table of Control Codes : Example : SF5 =CDWINDOWS[33]WIN[33]
TAB [24] HOME [3C] [[30]] [31] BS [35] ESC [36]
ALT [26] END [3D] ↑ [38] ↓ [39] ← [3A] → [3B]
SHIFT [27] PGUP [3E] F1 [44] F2 [45] F3 [46] F4 [47]
CTRL [28] PGDN [3F] F5 [48] F6 [49] F7 [4A] F8 [4B]
ENTER[33] INS [40] F9 [4C] F10 [4D] F11 [4E] F12 [4F]
PRTSC[7E] DEL [41] RELEASE [90]
PAUSE[7F] SF1 to SF10 = [70] to [79]
Key delay Mode :
0.1 Sec [80] 0.5 Sec [81] 1 Sec [82] 2 Sec [83] 3 Sec [84]
5 Sec [85] 10 Sec [86] 30 Sec [87] 1 Min [88] 1 Hour [89]
SF1 =
SF2 =
SF3 =
SF4 =
SF5 =
SF6 =
SF7 =
SF8 =
SF9 =
SF10 =
KBT ID: AD111695 ESC: Quit/Save/Transmit

Figure 3.1: The Macro Editor screen

When you have finished editing, press the ESC key. At the bottom line of the screen you will be prompted to choose if you want to save the file and/or if you want to transmit it to the EEPROM.

After confirmation with the Enter key, the tasks are carried out and you return to DOS.

3.5 Example

We will explain all macro functions that you can find in the EXAMPLE.TXT We will explain all macro functions that you can find in the EXAMPLE.TXT macro script file. When typing SFED3220 EXAMPLE.TXT the following editor screen will appear:

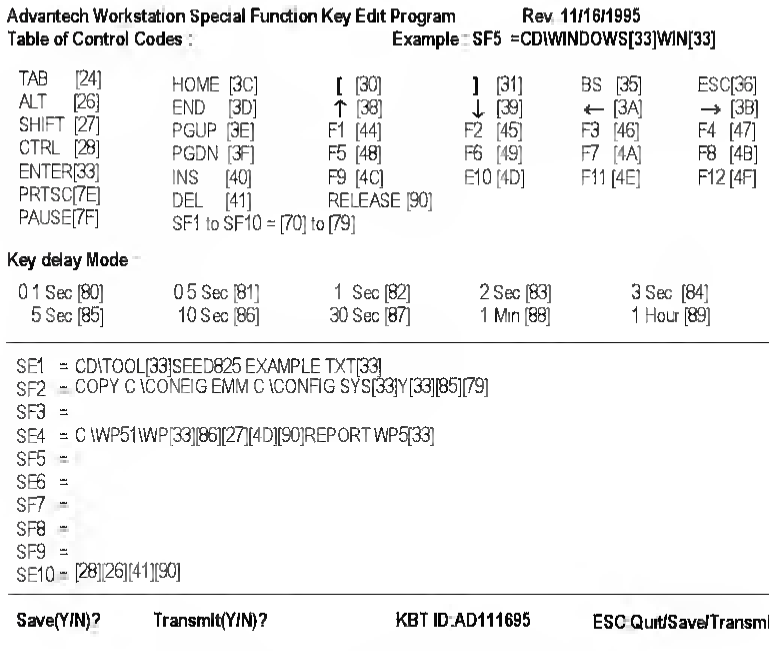
Advantech Workstation Special Function Key Edit Program Rev. 11/16/1995
Table of Control Codes : Example : SF5 =CD\WINDOWS[33]WIN[33]
TAB [24] HOME [3C] [[30]] [31] BS [35] ESC[36]
ALT [26] END [3D] ↑ [38] ↓ [39] ← [3A] → [3B]
SHIFT [27] PGUP [3E] F1 [44] F2 [45] F3 [46] F4 [47]
CTRL [28] PGDN [3F] F5 [48] F6 [49] F7 [4A] F8 [4B]
ENTER[33] INS [40] F9 [4C] F10 [4D] F11 [4E] F12 [4F]
PRTSC[7E] DEL [41] RELEASE [90]
PAUSE[7F] SF1 to SF10 = [70] to [79]
Key delay Mode
0.1 Sec [80] 0.5 Sec [81] 1 Sec [82] 2 Sec [83] 3 Sec [84]
5 Sec [85] 10 Sec [86] 30 Sec [87] 1 Min [88] 1 Hour [89]
SF1 = CD\TOOL[33]SEED825 EXAMPLE.TXT[33]
SF2 = COPY C:\CONFIG.EMM C:\CONFIG.SYS[33]Y[33][85][79]
SF3 =
SF4 = C:\WP51\WP[33][86][27][4D][90]REPORT.WP5[33]
SF5 =
SF6 =
SF7 =
SF8 =
SF9 =
SF10 = [28][26][41][90]
Save(Y/N)? Transmit(Y/N)? KBT ID:AD111695 ESC:Quit/Save/Transmit

Figure 3.2: Macro examples

SF1 = CD\TOOL[33] SFED825 EXAMPLE.TXT[33]

This macro changes to the TOOL directory, then starts up SFED3220 COM with EXAMPLE TXT

SF2 = COPY C:\CONFIG.EMM C:\CONFIG.SYS [33] Y [33] [85] [79]

The configuration information is changed by copying CONFIG EMM to CONFIG SYS After a delay of 5 seconds, [85], the macro invokes macro function key SF10, [79], which was defined to reset the system

SF4 = C:\WP51\WP[33][86][27][4D][90]REPORT.WP5[33]

This example shows that after a macro executes, it is able to direct the program to accomplish several tasks WordPerfect is started After a delay of 10 seconds (time to load the program), the

command Shift-F10, [27][4D], is issued to import a text file The name of the text file (REPORT WP5) is inserted, and finally ENTER, [33], causes the text file to be loaded and displayed on the screen

SF10 = [28][26][41][90]

Restarts the computer (CTRL-ALT-DEL)

Appendix A

Display Timing Mode & OSD

- Supported input timing modes
- OSD operation keypad
- OSD function and operation

Appendix A Display Timing Mode and OSD

A.1 Supported Input Timing Modes

The nineteen kinds of timings below are already programmed in this module. The input synchronous signals are automatically recognized.

Resolution	Vertical Frequencies			
	60 Hz	70 Hz	72 Hz	75 Hz
640 x 480	Yes			Yes
800 x 600	Yes	Yes		Yes

Table A.1: Supported Input Formats

Note 1: *Even if the preset timing is entered, a little adjustment of the functions such as Horizontal period, CLK-delay and display position, are required. The adjusted values are memorized in every preset number.*

Note 2: *This module recognizes the synchronous signals with near preset timing of the frequency of the HS and Vsync, even in the case that the signals other than the preset timing that were entered.*

Note 3: *Because adjustments may not fit, such as differing magnifying ratios or, in the case that you use it except for the display timing that was preset.*

A.2 OSD Operation Keypad

The OSD keypad, including six keys and a two color indicator, is designed as the OSD operation interface

The six keypad functions are in Table A-2

Auto	Press this button to execute auto adjustment process
Sel	Press to show the OSD screen or select an item to change its setting
◀ ▶	To move between items or increase or decrease setting
Exit	To exit from the current setting in OSD function
On/OFF	Turns display backlight ON and OFF

*Table A.2: **Keypad functions***

Note: The green light means that the COMMON board detects the input signal and ends output signal to LCD panel

A.3 OSD function and operation

Auto-adjustment process or to adjust manually:

1. Press [Sel] button to display the OSD Menu shown below
2. Press ◀ or ▶ button to scroll to the desired menu option
3. Press [Sel] button to select the menu option
4. Press ◀ or ▶ button to adjust the setting
5. Press [Exit] button or wait until time out to save changes and exit the menu or sub-menu

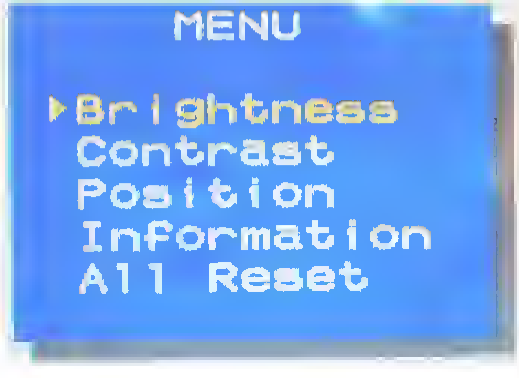

Figure A.1: OSD menu

Table A-3 is the OSD menu hierarchy and function description

Main Menu	Sub Menu	Sub Menu	Functionality
Brightness	Reset Brightness		Adjust display brightness
Contrast	Contrast	Reset Contrast	Adjust RGB contrast simultaneously
	R Sub Contrast	Reset R Contrast	Adjust R contrast
	G Sub Contrast	Reset G Contrast	Adjust G contrast
	B Sub Contrast	Reset B Contrast	Adjust B contrast
Position	H. Size	Reset H. Size	Adjust clock number per line
	Clock Phase	Reset Clock Phase	Adjust phase of ADC sample clock
	H. Position	Reset H. Position	Adjust display image left or right
	V. Position	Reset V. Position	Adjust display image up or down
Information			Display input mode information
All Reset			Reset all parameters to factory default setting

Table A.3: OSD Functionality

Appendix B

Touchscreen (optional)

- Installation of touchscreen driver

Appendix B Optional Touchscreen

B.1 Specifications

Electrical

Operating Voltage:	3.3 to 5 V_{DC} typical
Sheet Resistance:	350 ± 22% W/square
Linearity:	+/- 1.5% full scale linearity error in either direction.
Insulation Resistance:	> 20 MΩ @ 25 V_{DC}.

Optical

Total light Transmission:	75% typical (> 74% @ 550 nm test)

Environmental

Operating Temperature Range:	-20°C to +50°C, 2 weeks at 50°C/90% RH
Storage Temperature High:	+70°C, 240 hours at ambient humidity
Storage Temperature Low:	-40°C, continuous at ambient humidity
Accelerated Aging:	100 hours continuous exposure at 60°C/95% RH
Thermal Shock:	25 cycles (one cycle is 30 min. dwell alternating from -40°C to +85°C with less than 10 min. trans fer time).

Mechanical

Activation Method:	Gloved or ungloved finger Delrin or plastic stylus (no metal) with 1mm radius full hemispherical tip
Activation Force:	< 25 g average with non-metal stylus < 50 g average with 5/8" diameter sili cone finger

Durability

Point Activation Life:	1 Million activations on a single point with a 5/8" diameter silicone finger with a 350 g load at 2 Hz
Character Activation Life:	>100,000 characters written within a 20mm x 20mm

B.2 Installation of Touchscreen Driver

The touchscreen for the FPM-3220 Series provides drivers for use with MS-DOS, Windows 3.1, 95, 98, NT, and 2000. For the detailed touch-screen driver installation procedure, please refer to the "TSCB-9516 Driver Installation Guide" in the CD-ROM of Industrial computing & HMI. The path is

D:/ Manual/ FPM-3220TV/ TSCB-9516 Drivers Installation Guide